'Building Resilient Learning Communities: Using Evidence to Support Student Success'.

The PhD and Missing Skills: Engagement with Industry

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CONTEXT

Responding to a call for a national level change around the quality of research teaching to identify and meet industry needs, and to this being interdisciplinary, this paper reports on Business Booster Training. Produced with 3 UK universities, intersecting with knowledge exchange and impact teams and with a national Graduate School of Social Sciences.

Introduction

UK universities must play a role in the UK Government's industry strategy which aims to 'help businesses create better, higher-paying jobs in every part of the United Kingdom (UK) with investment in the skills, industries and infrastructures of the future' (HM Gov, 2017: 12). While the goal is clear, there is little guidance about how the post-graduate research (PGR) training could evolve to produce industry-ready graduates.

This sits within global questions about what a PhD is for, with an increasing interest in awards and scholarships that have an applied or collaborative element (Gibbons et al, 1994). In the ESRC Scottish Graduate School of Social Sciences Doctoral Training Partnership (SGSSS-DTP) we have a commitment to provide a collaborative opportunity that is engaged with by > 30% of our award holders. At SGSSS-DTP we meet this 'steer' by awarding collaborative studentships with non-academic partners built into the supervision teams, and a range of 3 month internships.

The apprenticeship model and traditional PhD research

Training towards a Doctor of Philosophy (PhD) qualification has been described as an apprenticeship with close supervision by a small team of scholars, likely to have completed the same trial of an academic PhD. In producing the PhD thesis, the student completes research, produces new knowledge, writes and enters into academic debate engaging in critical evaluation (Zukas and Andersen, 2012). Each activity provides a conduit between them and the educational community, but not necessarily any community beyond the academy.

As Hager points out (2005) the community works by placing the authority for creating the learning space, on supervisors and rarely can students impact, intervene or transform the learning spaces available. Many have reported that this model comes with isolation, and social alienation that may be impacting on submission rates as student struggle to endure. Thus the typical PhD habitus where disciplinary depth (East, Stokes & Walker, 2014) and presenting solo-authored material is the basis of qualifications does not deliver what Borrell-Damian, Morais and Smith (2015) demonstrated were the skills that industry-partners value: teamwork and interdisciplinary working.

The steady rise in the number of people beginning PhD research cannot be matched by the number of academic posts available, and those wishing to stay in the UK and in the academy face growing competition for jobs. Additionally, the increasing emphasis on impact pathways for the UKs Research Excellence Framework (REF), mean that doctoral students can only benefit from collaboration with partners in industry. Indeed, the UK Quality Assurance Agency (QAA) have included relevance to work as a guiding principle for research degrees encouraging students to 'cultivate business acumen' (QAA, 2015: 5).

Such collaborations have been recognised as strategically important, though difficult to produce with Borrell-Damian et al highlighting the dominant European discourse of 'the basic problem is that universities have no contact with industry and

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business' (2015: 10). While this view was challenged in their report, and as business partnerships help deliver aspirations of being a 'civic university', still many PhD students have no contact with industry and business.

SGSSS-DTP have been keen to innovate, valuing the learning derived from collaborative working. More than the 'bilingual' bridging and development of transferable skills (Borrell-Damian et al, 2015) we seek to produce students who are part of a wider network, and who are *confident* in transferable skills. Confidence and assurance are also included in Walker et al's (2010) theorizing of capabilities graduates need to affect social transformation, so fostering these skills is good for all students (East, Stokes and Walker, 2014) and all sectors of employment.

Collaborative awards have been a successful strategy from the ESRC and has played out in the SGSSS-DTP with students on these awards highly rating the 'additionality' of their award. SGSSS-DTP have also built a strong internship scheme of 3 months paid work. The challenge of bringing in new organisations is real, and research commissioned by SGSSS-DTP concluded that building relationships takes time and start on a small scale, building up to greater investment (Smith, 2018). Commitment to part-fund a PhD (10-50% investment depending on the size of the organisation) or an internship (around £5000) when the organisation isn't clear what their return will be has made it difficult to engage industry. There is growing evidence (Borrell-Damian et al, 2015) that companies benefit hugely from collaboration whatever the size of their organisation (including small and medium enterprises or SMEs) increasing competitiveness, enhanced market position, accessing innovation funding, build cutting-edge and/or technical advancements, and attract stronger employees (including post-docs).

A potential solution is to first engage industry in a smaller commitment and meet students during training, as a foundation to greater investments.

Methodology

This paper evaluates innovative training to support working with industry. A broad introduction to the training strategy of SGSSS-DTP will provide context of where the Business Booster training 'sits'. The training strategy was developed as a 'vision' in 2017 as the Doctoral Training Centre (DTC) evolved into a Partnership (DTP) and the post of Deputy Director - Training was created and appointed (Jo Ferrie). This provided a unique space to re-imagine what a comprehensive training programme could be, and to examine what today's PhD students' need. Training that linked to business models and practices was an evident gap, though one that the SGSSS-DTP was fully committed to filling, and thus avoiding what Murray et al argued '... should not be ignored through convenience, ignorance or willful neglect' (2017: 112).

The Scottish Graduate School of Social Sciences – Doctoral Training Partnership

Events in the Programme by Thematic Area	
• **Cohort Building**	**Overview of SGSSS-**
Induction Event: hosted in November of first year for all new ESRC students & supervisors	
Steer Event: annual event for 'steer' award holders: advanced quantitative; dataset; industry & interdisciplinary awards	
Final Year Conference: hosted in June	
• **Method & Methodology**	
Advanced Training, 12 events throughout the year hosted by partners	
Spring into Methods: 8 x 2.5 days interdisciplinary methods training in partnership with Scottish Graduate School of Arts & Humanities	
• **(Inter)Disciplinary**	
Hub Festivals: (inter)disciplinary space to negotiate grand challenges	
Pathway Training: meets subject-specific training gaps	
• **Well-Being & Employability**	

Student-Led Symposium: curated by Student Representatives often focused on well-being	DTP Training
Business Booster Training	
• **All Themes**	
Summer School: 3 days delivering 40+ half day training events	

Figure 1: Overview of SGSSS-DTP Training in the DTP period 2017-2023

SGSSS-DTP was founded as a DTC (2011-2017), awarded DTP status in 2017 (2017-2024): all 16 Scottish Universities with a strong social science element are partners. Funded by the ESRC in partnership with the Scottish Funding Council (SFC) and the 16 universities, the training programme serves around 3000 doctoral students.

The DD-T has led a dedicated body of work and has tripled the number of events available and quadrupled the number of hours of training available. The training (see Figure 1 for an overview) is advanced, either in relation to 'core training' (ESRC, 2015), or in the sense that a researcher must be advanced before the training becomes useful (for example, software training where students must bring their own data).

Working with IAAs

The Business Booster training was funded as part of an ESRC grant of £250,000 awarded to 2 Impact Acceleration Accounts (IAAs) at the Universities of Edinburgh and Glasgow alongside colleagues from the University of Aberdeen and the SGSSS-DTP. The aim of the grant was to enhance capacity and capability for engagement with private sector companies. Three shared objectives were established by the partnership: a suite of training (the Business Booster training), a report mapping existing capabilities across the SGSSS-DTP (Smith, 2018), and a list of businesses to target for future collaborative activity such as studentships and internships.

The training: producing a 3-site model

In partnership, our aim was to produce training that could support students' engagement with industry.

Each IAA was given the task of developing a training idea ahead of a brainstorming meeting held in May 2018. Also attending the meeting were the KE and Partnerships Manager and the DD-T from SGSSS-DTP, thus training was developed at the nexus of those experienced working with business, those experienced developing excellent academic training and those working across interdisciplinary boundaries. We then partnered with Skillfuence to deliver our training vision.

The training is outlined in Figure 2 and was designed to deliver tools, techniques and strategies to help students face a 'live' business challenge as they ultimately pitched research ideas and solutions to businesses.

Recruitment

The training was open to any PhD student who was a member of SGSSS-DTP. Thirty places were available, and students applied by writing a short 250-word piece about why the training would be valuable. Strong applications from 100 students resulted in 31 places being awarded, and students represented 12 different universities.

Skillfluence and the University of Aberdeen used their networks and 4 small organisations (2 self-identified as start-ups) agreed to participate by presenting an existing real-world problem and asking students in teams to pitch solutions.

Training & Evaluation process

This evaluation draws on 3 phases of feedback after each event. The evaluation includes reflections from industrial partners. As authors, the DD-T and KE & Partnership Manager of SGSSS-DTP bridge the gap between research innovators and evaluators and our reflections are embedded in the paper. This insider position permits greater understanding of the issues and aims but has the risk of over-stating the achievements, (Mercer, 2007). The involvement of a third party to co-deliver the training, Skillfluence, is a kind of buffer that allows us to be critical in objective as well as subjective ways. The aim of this paper is to ask questions about how we better train doctoral students in building confidence with industry, and our honesty in discussing the gaps that remain from this initiative, we hope, is reassuring that we've not used our insider position to 'sugar-coat' findings.

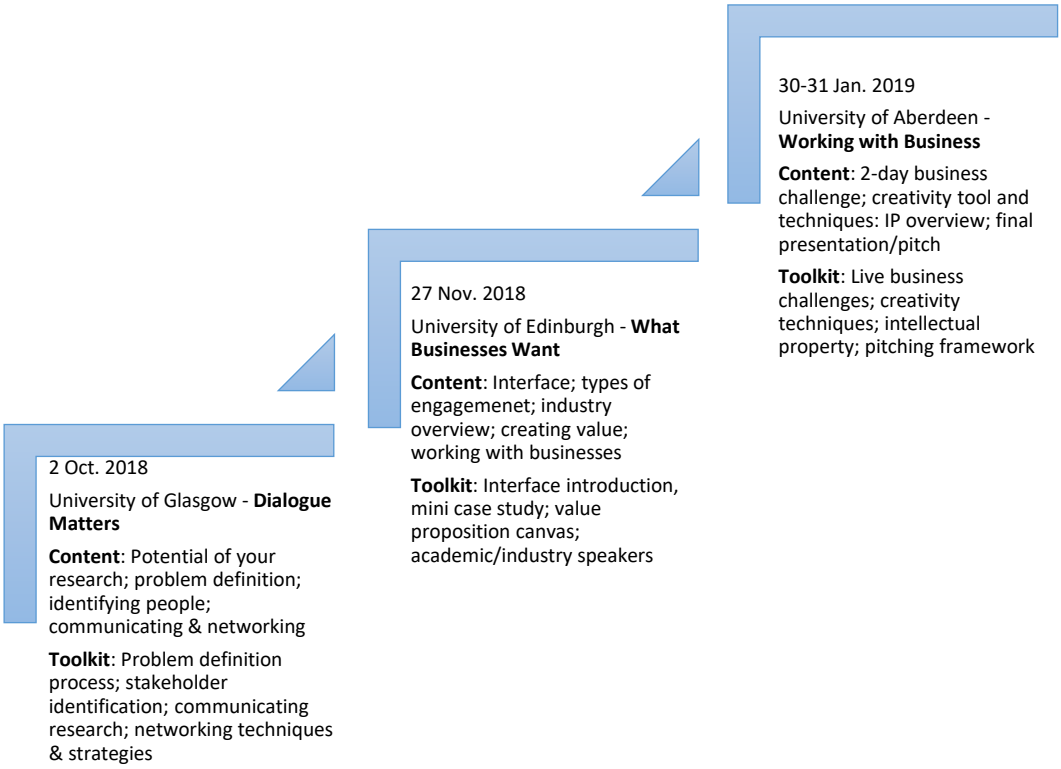

Figure 2: Overview of the 3-site training

Student evaluation of training: overall satisfaction

Three thematic areas that emerged from competed evaluations: general satisfaction, the value of interaction and relevance to own work.

The training was a success, though there were learning points about the set-up of events and which industry partners to collaborate with. All agreed their confidence in articulating how research could contribute to industry had improved, except one, who said it was the same but enjoyed the training anyway.

> *The training program has increased my confidence by highlighting reasons why a business would engage with my research. This included my knowledge of my subject, how I engage with audiences and my critical thinking skills. (1st year student).*

Evaluation Question	Scoring system used	Event 1	Event 2	Event 3	Cumulative score
To what extent did the workshop meet your expectations?	5 high vs 1 low	4.15	3.81	4.00	3.99
The delegate information provided prior to the event	5 high vs 1 low	4.25	4.38	4.22	4.28
Substantive content of the event (skills and techniques taught)	5 very useful vs 1 not at all useful	4.00	3.62	3.89	3.98
Quality of teaching (engaging, interesting, well presented)	5 excellent vs 1 poor	4.40	3.95	4.11	4.01
Relevance to my own work	5 excellent vs 1 poor	4.3	3.90	3.67	3.95

Table 1: Average Evaluation Scores for Event 1-3

Table 1 compares average scores given on the evaluation forms from the first 3 events alongside cumulative scores.

The structure of the events evolved as we were able to reflect on the first: we introduced more interactive sessions which horizontalized the training event (rather than hierarchical training, or top-down approaches where students sit, and listen).

Value of interaction

Interacting with others gave students opportunities to interrogate their learning and apply it to their own fields of research and was highly valued (‘*Amazing opportunities for networking*’, 2nd year student). While the speakers were highly valued by students (‘*Really great speaker. Very engaging, approachable and funny!*’ 1st year student), and all students evaluated the quality of teaching at event 1 which was more practitioner-led as being either 4 or 5 out of 5 (5 denoting excellent: average 4.4/5, see table 1) the really valuable learning came when students were able to negotiate the content with their peers. Reflecting on what they liked most,

> *Ability to learn from others at more advanced stages of their PhD, sharing of best practices and experiences. (1st year student)*

Team-working is one element of Mode 2 learning that is not generally associated with the Mode 1 dominated PhD approach which traditionally isolates students into their disciplinary ‘silos’. This habitus made the training initially challenging for some,

> *I have to admit I struggled with applying the concepts and framework to my own material (which I expected to find difficult, though maybe I'm also too much on the "humanist" spectrum?) - I think I would find it a little less alienating if you used some specific scenarios to picture ourselves in. (3rd year student)*

As the events progressed, the student evaluations increasingly praised team-working elements. For one, the interaction, team-working and learning from others was the highlight of the training, demonstrating the training’s success in maintaining academic relevance while being industry focused,

The opportunity to interact with and pitch to industrial partners was a clear positive for most: ‘*Presentation was a challenge but very rewarding*’ (1st year student); ‘*[highlight was] preparing a pitch for real companies*’ (4th year student); and ‘*[highlight was] ‘engagement with members of the industry*’ (2nd year student).

The industry partners also provided excellent feedback:

> *There were certainly some suggestions that came out from the discussions, we are already looking to incorporate into our strategy. (Expanding IT consultancy)*

> *I was amazed at the insights my group were able to come up with ... I will be using the recommendations from the challenge. Thanks again for a brilliant experience. I just loved meeting the students, it was energising to speak to them. (Health start-up)*

Relevance to own research

The interactive sessions enabled students to draw links between the training and their own work or ambitions, but it was the second event, with an industry expert, an academic that has worked with industry and a post-doc now building business networks that were cited as the element students liked the most,

> *The speakers: I found [academic with industry links] information very useful as she gave us useful insight into relationship building within a business setting. (1st year student)*

This facility to extract value from a work-based activity back to the traditional academic arena demonstrates what our students are missing when such activities and experiences are considered ‘additional’ to a PhD. Related to this is the quote from another student,

> *The course has given me an understanding of key elements needed when working with a Business; for example, a project needs clear communication, expectation management and key milestones. (1st year student)*

What is especially enlightening about this quote, is that these skills are instrumental to PhD study which requires a clear research aim and questions; good communication between student and supervisors and in time, examiners; management of supervision arrangements and then a clear timeline underpinned by annual progress reviews.

Things we chose to do differently in 2019

This feedback informed redevelopment of the training for 2019. Some changes were relatively simple, such as delivering the training as a multi-day event in the same location, using less acronyms and getting students into some fresh air at least once during the day.

The evaluation revealed one industrial partner's task was oriented towards economic gain and this did not engage students well: *The [business representative] looked super unenthusiastic and I disengaged as a result.* (1st year student). Other presenters had focused on 'public good' issues such as sustainability. For the 2019 event, we worked with Skillfluence to select industry partners with a social element to their business.

Conclusion

The investment into this initiative was vital giving space for an imaginative solution to the industry training-gap. This investment requires energy and co-working and has resulted in exciting and useful training. A no-pressure brainstorming session allowed us to focus clearly on our context and our sector, and others should take time to include this step. Further the project benefitted from having multi-institution buy-in with a national strategy and this enabled us to draw on a range of expertise.

The 3-site model ultimately, did not enhance the training, but did allow us to conceive of 3 distinct training objectives which together, delivered the overall aim of building capacity and capability for engaging with business.

Choosing businesses carefully is a factor in success, and industry partners should present strategic challenges (students enjoyed sustainability challenges) rather than operational problems (increasing income/turnover) in order to attract and sustain energy from talented social science researchers.

As well as delivering training that successfully meets the gap in traditional PhD training, this initiative also helped build networks between SGSSS-DTP, the IAAs and industrial partners who may now be inclined to contribute confidently to higher-investment initiatives such as internships and collaborative awards. It has allowed us to build case studies which we hope will convince new partners to engage with our students, and the social sciences more broadly.

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